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NOTICE OF ALLOWANCE AND FEE(S) DUE

25224 7590 12/30/2009

MORRISON & FOERSTER, LLP
555 WEST FIFTH STREET
SUITE 3500
LOS ANGELES, CA 90013-1024

EXAMINER

COLEMAN, RYAN L

ART UNIT

PAPER NUMBER

1792

DATE MAILED: 12/30/2009

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/579,423

05/11/2006

Takayuki Toshima

514312000400

1339

TITLE OF INVENTION: SUBSTRATE PROCESSING METHOD, SUBSTRATE PROCESSING APPARATUS AND COMPUTER-READABLE MEMORY MEDIUM

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO | \$1510 | \$300 | \$0 | \$1810 | 03/30/2010 |

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

25224 7590 12/30/2009

MORRISON & FOERSTER, LLP
555 WEST FIFTH STREET
SUITE 3500
LOS ANGELES, CA 90013-1024

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

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|--------------------|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/579,423 05/11/2006 Takayuki Toshima 514312000400 1339

TITLE OF INVENTION: SUBSTRATE PROCESSING METHOD, SUBSTRATE PROCESSING APPARATUS AND COMPUTER-READABLE MEMORY MEDIUM

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|-------------|--------------|---------------|---------------------|----------------------|------------------|----------|
|-------------|--------------|---------------|---------------------|----------------------|------------------|----------|

nonprovisional NO \$1510 \$300 \$0 \$1810 03/30/2010

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|----------|----------|----------------|
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COLEMAN, RYAN L 1792 134-001000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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| 10/579,423 | 05/11/2006 | Takayuki Toshima | 514312000400 | 1339 |
| 25224 | 7590 | 12/30/2009 | EXAMINER | |
| MORRISON & FOERSTER, LLP 555 WEST FIFTH STREET SUITE 3500 LOS ANGELES, CA 90013-1024 | | | COLEMAN, RYAN L | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1792 | |
| DATE MAILED: 12/30/2009 | | | | |

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 798 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 798 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

| | | | |
|-------------------------------|------------------------|---------------------|--|
| Notice of Allowability | Application No. | Applicant(s) | |
| | 10/579,423 | TOSHIMA ET AL. | |
| | Examiner | Art Unit | |
| | RYAN COLEMAN | 1792 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to applicant's amendments filed October 16, 2009.
2. ☒ The allowed claim(s) is/are 1-5,7-14,16-21,29,30,32 and 34.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>May 11, 2006</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

/RLC/
Ryan L. Coleman
Examiner
12/18/09

/Michael Barr/
Supervisory Patent Examiner, Art Unit 1792

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-21 and 29-36, in the reply filed on October 16, 2009 is acknowledged. Applicant withdrew claims 22-28 in the same reply.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

3. Authorization for this examiner's amendment was given in a telephone interview with David Kim on December 16, 2009.

4. Replace claim 1 with the following:

A substrate processing method for removing an ArF resist film from a substrate having the ArF resist film, comprising the steps of:

irradiating an ultraviolet ray having a predetermined wavelength to the ArF resist film;

altering the ArF resist film irradiated with the ultraviolet ray into a water-soluble state by placing the substrate in a chamber and feeding an ozone gas and water vapor to the chamber; and

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removing the ArF resist film from the substrate by feeding pure water to the ArF resist film altered into the water soluble state[[]].

wherein when the water vapor and the ozone gas are fed to the chamber, a feed amount of ozone gas with respect to the water vapor is decreased while the water vapor is fed to said chamber at a constant flow rate in such a way as not to cause dew condensation on the substrate placed in the chamber.

5. Replace claim 3 with the following:

A substrate processing method for removing an antireflection film from a substrate having said antireflection film, comprising the steps of:

irradiating an ultraviolet ray having a predetermined wavelength to the antireflection film;

altering the antireflection film irradiated with the ultraviolet ray into a water-soluble state by placing the substrate in a chamber and feeding an ozone gas and water vapor to the chamber; and

removing said antireflection film from the substrate by feeding pure water to said reflection film altered into the water-soluble state[[]].

wherein when the water vapor and the ozone gas are fed to the chamber, a feed amount of ozone gas with respect to the water vapor is decreased while the water vapor is fed to said chamber at a constant flow rate in such a way as not to cause dew condensation on the substrate placed in the chamber.

6. Replace claim 4 with the following:

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A substrate processing method for removing a resist film from a substrate having the resist film undergone an ion implantation process at a high dose, comprising the steps of:

irradiating an ultraviolet ray having a predetermined wavelength to said resist film;

altering the resist film irradiated with the ultraviolet ray into a water-soluble state by placing the substrate in a chamber and feeding an ozone gas and water vapor to the chamber; and

removing the resist film from the substrate by feeding pure water to the resist film altered into the water soluble state[.].

wherein when the water vapor and the ozone gas are fed to the chamber, a feed amount of ozone gas with respect to the water vapor is decreased while the water vapor is fed to said chamber at a constant flow rate in such a way as not to cause dew condensation on the substrate placed in the chamber.

7. Replace claim 10 with the following:

A substrate processing method for removing an ArF resist film from a substrate having the ArF resist film, comprising the steps of:

irradiating an ultraviolet ray having a predetermined wavelength to the ArF resist film;

altering said ArF resist film irradiated with the ultraviolet ray in a such a way as to be water-soluble with a predetermined chemical solution by placing the substrate in a chamber and feeding an ozone gas and water vapor to the chamber; and

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removing the ArF resist film from the substrate by feeding the chemical liquid to the altered ArF resist film[[]].

wherein when the water vapor and the ozone gas are fed to the chamber, a feed amount of ozone gas with respect to the water vapor is decreased while the water vapor is fed to the chamber at a constant flow rate in such a way as not to cause dew condensation on the substrate placed in the chamber.

8. Replace claim 12 with the following:

A substrate processing method for removing an antireflection film from a substrate having the antireflection film, comprising the steps of:

irradiating an ultraviolet ray having a predetermined wavelength to the antireflection film;

altering said antireflection film irradiated with the ultraviolet ray in a such a way as to be soluble with a predetermined chemical liquid by placing the substrate in a chamber and feeding an ozone gas and water vapor to the chamber; and

removing the antireflection film from the substrate by feeding the chemical liquid to the altered antireflection film[[]].

wherein when the water vapor and the ozone gas are fed to the chamber, a feed amount of ozone gas with respect to the water vapor is decreased while the water vapor is fed to the chamber at a constant flow rate in such a way as not to cause dew condensation on the substrate placed in the chamber.

9. Replace claim 13 with the following:

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A substrate processing method for removing a resist film from a substrate having the resist film undergone an ion implantation process at a high dose, comprising the steps of:

irradiating an ultraviolet ray having a predetermined wavelength to the resist film;

altering the resist film irradiated with the ultraviolet ray in a such a way as to be soluble with a predetermined chemical liquid by placing said substrate in a chamber and feeding an ozone gas and water vapor to the chamber; and

removing the resist film from the substrate by feeding the chemical liquid to the altered resist film[[]],

wherein when the water vapor and the ozone gas are fed to the chamber, a feed amount of ozone gas with respect to the water vapor is decreased while the water vapor is fed to the chamber at a constant flow rate in such a way as not to cause dew condensation on the substrate placed in the chamber.

10. In claims 7 and 8, replace the number "6" with the number "1".
11. In claims 16 and 17, replace the number "15" with the number "10".
12. In claim 32, replace the number "31" with the number "3".
13. In claim 34, replace the number "33" with the number "4".
14. Cancel claims 6, 15, 22-28, 31, 33, 35, and 36.

Reasons for Allowance

15. The following is an examiner's statement of reasons for allowance: the reviewed prior art does not teach or render obvious the inventions specified in the independent claims.

16. The most relevant prior art is U.S. Patent Application Publication No. 2002/0185225 by Toshima et al. (hereafter referred to as "Toshima '225"), U.S. Patent No. 6,616,773 to Kuzumoto et al. (hereafter referred to as "Kuzumoto"), and U.S. Patent No. 6,613,692 to Toshima et al. (hereafter referred to as "Toshima '692"). Toshima '225 teaches a method of removing ArF resist film from a substrate that comprises altering the ArF resist film into a water-soluble state by placing the substrate in a chamber and feeding ozone gas and water vapor into the chamber (Par. 0035, 0036, and 0093-0097). Toshima '225 teaches removing the altered resist film from the substrate by feeding rinse fluid to the altered film (Par. 0097). Kuzumoto teaches that it is advantageous to irradiate a resist layer with ultraviolet light of a predetermined wavelength prior to performing a resist-removal treatment with ozone gas and water vapor (Col. 20, 39-62). Toshima '692 teaches that a method of removing resist with ozone and water vapor can also remove an antireflective layer positioned beneath the resist layer (Col. 7, line 25 to Col. 8, line 52; Col. 38, 41-50). However, the prior art fails to teach or suggest the concept of decreasing a feed amount of ozone gas with respect to water vapor flowing into the chamber at a constant flow rate in such a way as not to cause dew condensation on the treated substrate.

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17. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN COLEMAN whose telephone number is (571)270-7376. The examiner can normally be reached on Monday-Friday, 9-5.

19. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/RLC/

Ryan L. Coleman

Patent Examiner, Art Unit 1792

December 18, 2009

/Michael Barr/

Supervisory Patent Examiner, Art

Unit 1792